

Measuring Power and Energy

Energy is the ability to do work. Work like lifting a weight, turning a motor or powering a light bulb. Energy can take many forms: light energy, heat energy, kinetic energy (the energy of motion), chemical energy, sound energy or electrical energy - among others. Any of these types of energy can be collected and then converted to another energy type to do work for us. This course will deal for the most part with electrical energy, which does much of the work in our homes, schools, offices and industries.

Power is the rate of doing work. A high-powered toaster can do its work faster than a low-powered one. The standard measure of electrical power is the **Watt**. A toaster uses about 1000 watts of power continuously while it is doing the work of browning your bread. A more powerful, faster toaster would use more watts.

To calculate energy, multiply power X time. So if your toaster was on nonstop for an hour (let's hope this doesn't actually happen at your house) you would use 1000 Watts X 1 hour = 1000 Watt-hours. 1000 Watt-hours can also be said another way, 1 **kiloWatt hour (kWh)**. The kiloWatt hour is the standard measure of electrical energy. If you ran your toaster for 2 hours, it would use 2 kWh and so on.

So Why Do We Use Fossil Fuels, Anyway?

The amount of energy in fossil fuels is just plain huge. One gallon of gasoline weighs just 6 pounds and contains about 35 kWh of energy, which a car uses up in roughly half an hour on the highway. A normal person pedaling continuously on a bicycle would take about 1000 hours to produce that much energy - and you can bet he'd lose more than six pounds in the process. Coal, diesel, oil and natural gas are all capable of producing staggering amounts of energy.

The treasure trove of energy we've found in fossil fuels has allowed our society to develop at an unprecedented rate. It has also altered the environment more than its early users could ever have imagined. Our challenge now is to get away from fossil fuels as quickly as possible and to find our energy sources elsewhere. It's time to stop looking for energy beneath our feet and start looking for energy from sun, wind and rain.



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